POISON IVY

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BOTANY

LEAFLET 12

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO
1926

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D. C. DAVIES, DIRECTOR

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO, U.S.A.

Photograph by R. E. Dahlgren.

ON RICH SOIL THE POISON IVY CLIMBS TREES BY MEANS OF ADVENTITIOUS ROOTLETS.

FIELD MUSEUM OF NATURAL HISTORY
DEPARTMENT OF BOTANY
CHICAGO, 1926

LEAFLET NUMBER 12

Poison Ivy

Of all plant pests poison ivy, with its kindred species, poison oak and poison sumac, are the most dreaded. It is well known that the slightest contact with the sap, the broken leaves and branches gives rise to a most painful irritation and itching of the skin. Some persons are so susceptible that they are seriously affected by merely handling things that have come into contact with the poison ivy, such as garden tools or the clothing of one who has walked through a poison ivy patch. Few fortunate persons are naturally immune.

The plants that cause ivy poisoning are botanically related, in fact all belong to one genus, *Rhus*, which includes also the harmless and attractive sumacs of our roadsides. There are three principal poisonous species of this genus in the eastern United States, and one on the Pacific Coast.*

The first and most common of the eastern species is the poison ivy itself, known botanically as *Rhus Toxicodendron*. Its species name, *Toxicodendron*, is composed of two Greek words that mean "poison-tree." Poison ivy is easily distinguished by its compound leaves of three leaflets. Its flowers, which appear late in spring, are clusters of inconspicuous, greenish-white bloom, followed by waxy white berries. The poison

*See J. B. McNair, *The Taxonomy of Poison Ivy*. Bot. Ser. Field Mus. Nat. Hist. Vol. IV, No. 3, 1925.

ivy has two principal habits of growth, being either shrub like or climbing. In one habit, the plant comes up as slender, stiffly erect, little branched shrubs from winding underground stems or rootstocks. The bark is rather smooth and light gray. The height is usually from one to three feet, though in rich, moist places it may reach four or five. In the other growth-habit, the main stem clambers up trees and over rocks or walls, sending out aerial roots that cling like those of the true English ivy. Because of the rooting habit of this form of poison ivy, the great pioneer botanist, Linnaeus, who never saw the growing plant, considered it as a separate species and gave it a separate name, *Rhus radicans—radicans* meaning "rooting"—but the present-day tendency is to regard the vine simply as a climbing form of a more or less variable species. In practically all the states of the Union except California, the poison ivy is found as a shrub where the woods are open and rather dry, and as a vine where they are rich and moist. Poison ivy vines with trunks nearly a foot through grow in the "hammocks" of Florida.

Very closely resembling the poison ivy are two species of poison oak, *Rhus quercifolia* of the eastern states, found along the Atlantic Coast from New Jersey to Texas, and *Rhus diversiloba*, which grows in California, Oregon, and Washington. Both of these plants look so much like the poison ivy that some botanists have tried to combine the three species into one.

The most vicious member, however, of this whole undesirable clan, is the poison sumac. Fortunately, this small tree is usually restricted to the margins of swamps, which are seldom visited except by occasional hunters and naturalists. Sometimes, where a road has been built through a bog, a clump of poison sumac will cause a great deal of trouble. Its leaves look very much like those of the common wayside sumac, though the

plants are actually not difficult to tell apart. In the first place, the common sumac never grows in bogs, and the poisonous variety never grows anywhere else. In the second, the fruits, both of common sumac and of the staghorn sumac, another ornamental variety, are red and grow in stiff, erect clusters or panicles, while the fruit of the poison sumac is a drooping bunch of white berries. It is a good general rule that white fruited species of sumac are poisonous, the red fruited ones not.

Sometimes the woodbine or Virginia creeper,* an ornamental vine, is confused with poison ivy and gets undeservedly blamed. The confusion is easy to avoid. The woodbine always has five leaflets whereas the poison ivy has three, hence the old adage: "Leaflets three, let it be." Moreover, the woodbine does not support itself by aerial roots like the poison ivy vine, but climbs like a grape with tendrils terminating in disks. Finally, its fruit, instead of being an elongated cluster of white berries, form a drooping, flattened bunch of purple berries.

HOW POISONING TAKES PLACE

It was formerly thought that the pollen of poison ivy, poison oak, and poison sumac was carried by the wind and caused the poisoning. Their pollen is, however, sticky and is never carried by the wind. Furthermore, it is not poisonous. It may in fact be rubbed on the skin of people easily poisoned, and in no case will poisoning take place. Experimentation has shown that neither the bark, the plant hairs, the surface of young branches, nor the surface of uninjured leaves cause poisoning when touched.

**Psedera quinquefolia* (L.) Green, at various times called *Ampelopsis* and *Parthenocissus.*

From J. P. Cornut, History of Canadian Plants, 1635.

THE FIRST PUBLISHED ILLUSTRATION OF POISON IVY.

The only part of these plants that will cause poisoning is the sap. If a stem be cut in half, a somewhat milky juice will be seen coming out in small drops from the outer portions of the stem. This outer portion, the bark, and soft growing layer underneath, corresponds to the portion of the willow branch and elderberry stem used for whistles. Under a microscope, the resinous sap is seen to come from small tubelike canals in the inner layer of this, the bast. Upon thorough examination, it is found that a new set of these canals forms with each spring and fall growth of wood, and that each separate canal is surrounded by glandular cells. These small cells pour their poisonous secretion into the canals. The canals extend from the smallest roots to the smallest branches and exist even within the flowers, fruits, and leaves. In the stalk of the leaf a row of about a dozen canals is found. The midrib and large veins have at least one canal each. These poison canals are found to extend out into the fine network of veins in the leaf. In the fruit, which has somewhat the shape of a mistletoe berry, many poison canals surround the seed. It is not possible to break any part of the plants without rupturing some of these canals and causing the poisonous sap to come out on the surface. The freed sap soon darkens and hardens to a black, shiny varnish, which fully protects the wound. An oriental relative of the poison sumac thus gives a sap which forms the well-known Chinese lacquer.

The young leaves of the plants are more easily injured than the mature ones. About the time when people, tired of being shut in all winter, are enjoying the first warm days of spring in a search for wild flowers, the plants are just budding out and not easily noticed. It is especially at this time of the year that most cases of ivy poisoning occur. When the pollen

was considered dangerous, ivy poisoning was thought to be the most frequent when the ivy was in full bloom, but blossoming does not take place until the leaves have reached their full growth, that is, six weeks after the plant has started to bud out. The plants are poisonous all the year around, but during autumn when the leaves become red and bright yellow, they are most easily noticed and avoided. Cases of poisoning are then fewer in number after the leaves have fallen, when it is necessary to bruise the stems to get in touch with the poison.

NATURE OF THE POISON

As the poison canals have the same structure as the resin canals in pine trees and in other plants, so one might expect the poison to be of a resinous nature. The latest work* on the nature of the poison gives the information that the poison, if not a resin, is at least intimately mixed with a resin. It is a clear amber-red, sticky, non-volatile liquid which floats on water. This sticky substance will adhere to the skin like pitch and is as difficult to remove.

SUSCEPTIBILITY TO THE POISON

It has been found that only about one person in eighteen is badly poisoned by ordinary contact with the sap. The resistance to poisoning appears to run in families. In some families all members are easily poisoned. In other families no cases of poisoning take place. In still others, one parent may be easily poisoned, while the children may not be susceptible, or some children may be easily poisoned. Generally if

*Those interested in the detailed discussion of poison ivy, its poison and treatment are referred to the book, *Rhus Dermatitis*, by James B. McNair, University of Chicago Press, Chicago, Illinois.

From Rost and Gilg.

FLOWERS AND FRUIT OF POISON IVY.

both parents are not easily poisoned, the children are also resistant. However, if the pure poison is placed on the skin of a person considered immune, poisoning will take place. Others who have studied the subject find that a person may be easily poisoned one year and not easily poisoned sometime later. The reverse is also known to be true. Many people, wishing to gain resistance to the poison have chewed the leaves of the plant, or swallowed tea made from the leaves. This has been followed by severe cases of internal poisoning. It is doubtful if immunity to the poison can be acquired in this manner, as the poison is not a protein and no other substances are known to produce immunity. A susceptible person may certainly be severely poisoned repeatedly during the same year. Immunity seems to be mostly a matter of thickness and condition of the skin. Animals are generally not susceptible. Goats will thrive on it. Cattle and horses are known to eat it without ill effects.

DESCRIPTION OF THE DISEASE

The poison may penetrate the skin by means of the sweat glands, the oil glands, the hair follicles, or even the surface of the skin itself. In from twelve hours to a week after the poison has been placed on the skin, a reddening and itching is noticed. The poisoning may never be more severe than this or it may cause blistering. If blisters form they may break and allow the serum to run freely over the surface. After about a week this condition disappears and the injured skin falls off in flakes. The poisoning is most often experienced between the fingers, on the back of the hands, on the forearms, or on face. It is very seldom that poisoning takes place in those portions of the body thickly covered by hair, although it may affect any

Photograph by C. F. Millspaugh.

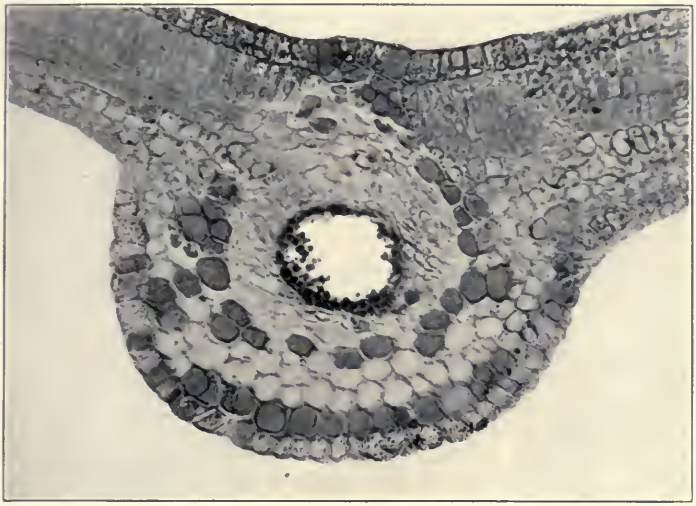
THIS WINTER SCENE SHOWS POISON IVY GROWING ON A FENCE. THE YOUNG, UPRIGHT, LIGHT GRAY, SMOOTH, BRITTLE STEMS ARE CHARACTERISTIC. IF THESE STEMS ARE BROKEN, EVEN IN WINTER, THE POISONOUS, SOMEWHAT MILKY, SAP WILL EXUDE. THE VIRGINIA CREEPER HAS DROOPING BRANCHES.

part of the body surface. The inside of the hands and soles of the feet are seldom poisoned because of their thick covering of skin. The ears may swell up to a large size and the eyelids may become so swollen as to interfere with vision. The changes in the skin caused by this poison are not easily distinguished from conditions caused by other skin poisons and skin diseases. If a person has been in a locality where poison ivy grows, it is likely that poison ivy is the cause. The distribution of the blisters on the skin is generally in strips or patches caused by contact with the plant.

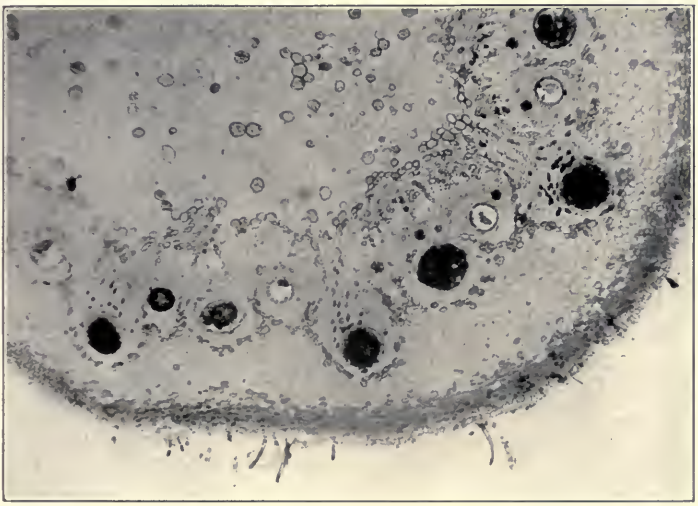
REMEDIES FOR IVY POISONING

Numerous methods of treatment for ivy poisoning have been used in the past. There is no real cure or preventative that will take the place of caution. The various salts of lead and zinc have been used as poison ivy remedies. They neutralize the poison to a certain extent, but not completely. The best and most effective preventative proves to be salts of iron, particularly iron chloride, which completely neutralizes the poison, though is effective as a remedy only if used in the very early stages. The use of iron chloride to the extent of five percent in a half and half mixture of alcohol and water is recommended. If the hands and face are bathed freely in this solution either before or immediately after one goes into a region known to contain poison ivy or its kindred plants, no ill effects need be expected. The remedy is cheap, is easily obtainable at any drug store, is non-poisonous and safe.

In ivy poisoning cases that actually develop and become acute the treatment is based on a recognition of the nature of the injury. The effects of ivy poisoning on the skin are much like those of a burn, and the treatment suggested resembles that successfully used during the war in burn cases. The affected parts are first bathed with iron chloride solution, to neutralize



SECTION THROUGH LEAF-RIB. THE POISONOUS RESIN IS CONTAINED IN THE CENTRAL DUCT.



SECTION THROUGH STEM SHOWING THE RESIN DUCTS (BLACK).

the poison. Then the skin is dried, and melted paraffin painted over it. A thin sheet of cotton is laid over the wound, and this also is covered with paraffin. The affected area is thus protected from the air and from rubbing, and new skin is given a chance to form.

ERADICATION OF THE PLANT

For the eradication of the plants, the U. S. Dept. of Agriculture recommends spraying with kerosene or sodium arsenite solution or treating the cut stems with sulphuric acid.

In the Field Museum poison ivy plants reproduced in fruit and flower and models of the enlarged flowers produced in the Stanley Field Plant Reproduction Laboratories of the Museum, are to be found together with an exhibit of other plants of the Sumac family in the Hall of Plant Life, Hall 29 on the second floor east.

The poisonous juice of the related lacquer tree, lacquered ware and economic products from the poison ivy relatives are with the plant economic exhibits in the adjoining Hall 28.